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**Diminishing Manufacturing Sources and Material Shortages  
Research and Support**

(5-20278 & 5-20279)

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11 August 1998 through 30 April 99

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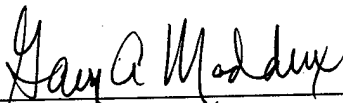
This technical report was prepared by the staff of the Research Institute, The University of Alabama in Huntsville. The purpose of this report is to provide documentation of the work performed and results obtained under Delivery Order 22 of AMCOM Contract No. DAAH01-98-D-R001. Mr. Gary Maddux was the principal investigator. Mr. Terry Mullins, Industrial Operations Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Aviation & Missile Command, provided technical coordination.

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Prepared for: Commander  
U.S. Army Aviation & Missile Command  
Redstone Arsenal, AL 35898

I have reviewed this report, dated October 1999 and the report contains no classified information.

  
\_\_\_\_\_  
Principal Investigator

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## **1.0 Introduction**

The Industrial Operations Division (IOD), Systems Engineering and Production Directorate (SEPD), Research, Development, and Engineering Center (RDEC), Aviation & Missile Command (AMCOM) has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM weapon systems. IOD evaluates the impacts of nonavailability of microelectronic parts on the life cycle supportability of the AMCOM weapon systems and evaluates the producibility of AMCOM weapon systems. IOD required engineering support in performing microelectronic technology trend assessments for several AMCOM systems and in assessing the impact of nonavailability on those systems.

In order to facilitate the analysis of these technologies, the Systems Management and Production Laboratory at The University of Alabama in Huntsville was tasked to conduct research regarding nonavailability problems occurring throughout the Department of Defense (DoD).

## **2.0 Objective**

The objective of this task was to conduct research and analysis of trends within DoD and industry over the past three years and make recommendations concerning new and innovative approaches related to Diminishing Manufacturing Sources and Material Shortages (DMSMS) management. The results of this research culminated in the 1999 DMSMS Conference. This conference addressed a number of technological, managerial and logistical issues related to DMSMS, and included representatives from the Services, other Government agencies, the electronics industry, and the defense contractor community.

## **3.0 Statement of Work**

The statement of work, as outlined in delivery order 22, was as follows:

### **3.1 Task 1 – DMSMS Conference**

UAH shall supply the material, personnel, expertise, and other resources to accomplish the following subtasks.

#### **3.1.1 Development of DMSMS Invitation List.**

UAH shall perform research to determine and up-to-date listing of industry and Government points-of-contact (POCs) that are actively involved in the management and solution of DMSMS related problems. In addition, a listing of important topics and concerns shall be solicited and validated as to widespread applicability. Results of this research shall be maintained and used as the basis for invitation to the conference.

### 3.1.2 Survey of Industry/Government Needs

UAH shall perform a survey of industry/government needs and requirements to proactively address DMSMS problem areas. This survey shall be conducted by an appropriate media, with use of both call-for-papers and electronic solicitation via the Internet.

### 3.1.3 Conference Support

UAH shall provide detailed support for all aspects of the 1998 DMSMS Conference. This support shall include coordination of event meeting times and location, event planning, speaker coordination, registration of attendees, on-site event support for audio-visual preparation, set-up and administration, and post-event closure of the conference.

### 3.2 Task 2 - Identification of DMSMS Trends in the Arrow System

UAH shall analyze and determine a support strategy for nonavailable Arrow spare parts. UAH shall identify and recommend solutions to nonavailable parts to the Arrow program. UAH shall research technologies/methodologies as solutions to the nonavailable spare parts and identify possible applications to the Arrow Program.

### 3.3 Task 3 - Evaluation of Simulation Based Design Techniques for DMSMS Resolution

UAH shall analyze and determine a strategy for applying Simulation Based Design (SBD) techniques to DMSMS problems. UAH shall investigate possible SBD technologies for design modeling and identify the tools or methodologies available to support DMSMS analysis and solutions for use in spare part design. UAH shall research applications used by other government agencies, and provide inputs regarding the application of the technologies/methodologies as solutions to the nonavailable spare parts. UAH shall also conduct a search for industry tools and techniques for application and use on government weapon system spare parts. All tools, techniques, methods, and the strategy shall be documented in the final report.

## 4.0 DMSMS Research Activities

Under this task members of the UAH Systems Management and Production Lab performed a detailed engineering research and analysis on the current processes and procedures used to determine the state of DMSMS. Specifically, trends within DoD were analyzed to determine the potential effects of obsolescence on AMCOM weapon systems. The findings from this research led to the 1999 DMSMS Conference, which was attended

by approximately 400 members of the defense community. The proceedings from this conference were delivered to the Government under separate cover.

In addition, DMSMS support was provided to the Arrow weapon system to mitigate the adverse effects of obsolescence. Efforts were also undertaken to develop simulation and visualization based tools to address DMSMS. The results of these two subtasks were published and delivered to IOD under separate cover.

## **5.0 Conclusion and Recommendations**

During the time frame allocated by the delivery order, members of the UAH Systems Management and Production Lab, with the cooperation of representatives from AMCOM Systems Engineering and Production Directorate performed research and analysis of microelectronic trends to address the DMSMS needs of AMCOM project offices. Because of the rapidly changing microelectronics industry, it is imperative that this analysis be refreshed on a periodic basis.